

FAQ

Q You say that the Mini-ITX PC draws only 21W at idle and 34W under load, compared to around 110W at idle for a normal PC and 150W under load. I use my only PC in the evenings, so how much could the Mini-ITX PC save me in a year?

A We'll assume you'll use your PC for three hours a day, to perform intensive tasks. In London, British Gas charges 16.536p per kilowatt-hour (kWh). This means if you use a kilowatt of power for an hour, you'll be charged 16.536p. The Mini-ITX PC uses 34W under load, and there are 1,000W in a kilowatt (kW). So the PC uses 0.034kW for three hours per day, which is 0.102kWh per day, and 37.23kWh per year. A normal PC uses 150W under load, so 0.45kWh per day and 164.25kWh per year.

A normal PC costs £27.16 (164.25kWh x 16.536p) per year while the Mini-ITX PC costs just £6.16 (37.23kWh x 16.536p) per year. This represents a saving of £21 per year.

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Build a Mini-ITX energy-efficient PC

Chris Finnamore shows you how to build a tiny PC with low-power components that can help you do your bit to save the planet and save some money, too

Modern PCs are extremely powerful, but many never use their full processing potential, running only far less strenuous tasks such as internet browsing and word processing. The big problem with not using all your computer's processing power is that you're wasting a lot of electricity.

To put it into context, even a low-powered desktop PC uses around 75W of power when idle. A dual-core computer with a fairly powerful graphics card and two hard disks uses around 110W when idle. All this wasted power isn't just bad for the environment: it's also bad for your wallet.

You don't have to have a high-powered computer if you want to run simple tasks. In this month's *PC Builder*, we'll show you how to build a PC using Mini-ITX and notebook components. It uses far less power than an average desktop, and is compact and quieter, too. The PC we'll show you how to build draws just 21W when idle and 34W under load. Over a year, this can save you a significant sum of money (see FAQ, left).

We decided to install Windows XP, so our Mini-ITX PC would be as useful as a full-blown desktop. Windows XP has the benefit of good power-management features, so it's easy to configure it to power down those components that aren't being used. We'll show you how to do this, too.

There are a few drawbacks. The Mini-ITX motherboard we used ships with a low-power 1.2GHz VIA processor preinstalled, which is nowhere near as quick as Intel's or AMD's processors. In our benchmarks our PC scored only 20, which is very slow, although reasonable for email, internet and office applications. Next, we used a notebook hard disk and optical drive. While more power-efficient and smaller, these are more expensive and slower than the desktop equivalents. Again, for basic internet use they won't cause any problems.

For simplicity, we sourced all our components from Mini-ITX.com's online store at www.mini-itx.com/store. Mini-ITX.com has a number of different motherboards, but as we were going to install Windows XP on our low-power PC we went for one of the most powerful. The case we chose ships with a 60W power supply, which is more than adequate for our components. Our shopping



▲ The finished PC is tiny and uses a maximum of 34W

list below shows you the components and prices. The hard disk and optical drive are standard notebook items and the memory is a normal desktop DDR module, so you may be able to find better deals from less specialist PC retailers.

1 It's easier to install the hard disk first when the case is empty. Plug the 2½in-to-3½in IDE adaptor into the back of the hard disk. The adaptor has one pin blocked off, so it can plug in only one way. Line it up with the missing pin on the back of the hard disk and push it gently into place.

The hard disk mounting tray is held in place with one screw. Your notebook hard disk must be held in place with four screws on its underside. The screws you need to use have flat heads, as rounded heads stop the tray sitting flat on the case when you fit it. Plug in a Molex power cable into the power cable attached to the back of the hard disk's adaptor.

2 Before you fit the motherboard, you'll need to remove the optical drive tray. Then fit the motherboard's backing plate. With the finished, shiny side facing outwards, press the plate into place from the inside and make sure it's secure.

3 Gripping the motherboard by its edges, lower it into the case while inserting the rear ports into the backing plate. Screw it into place with four screws at the edges. Plug one end of your IDE ribbon cable into the hard disk's 2½in-to-3½in adaptor. The IDE cable's plug has a notch at the top, so it will fit only one way into the adaptor. Plug the other end of the cable into the motherboard; again, it will fit only one way.

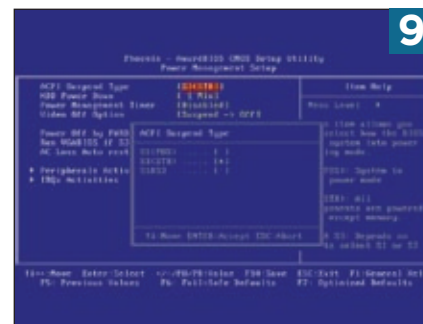
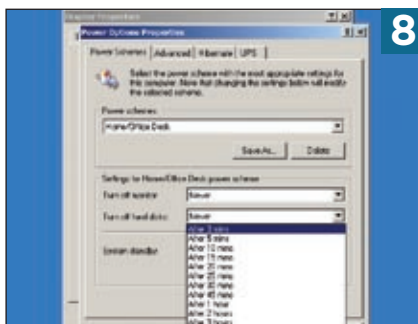
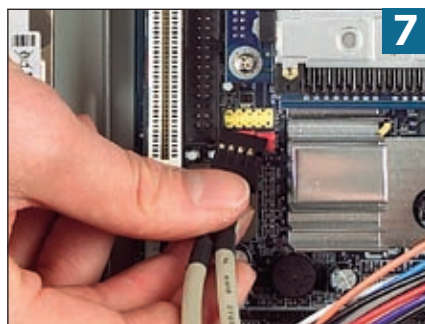
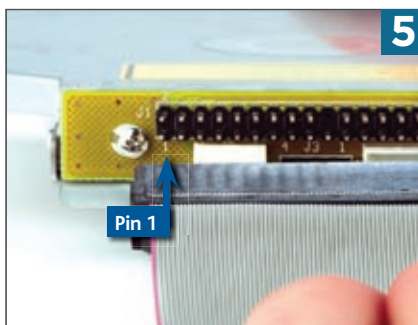
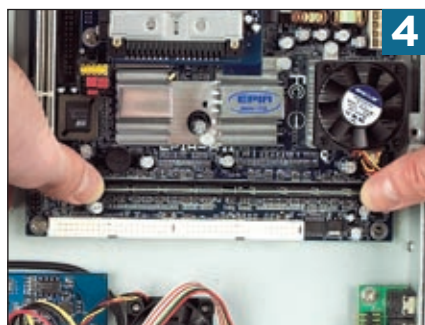
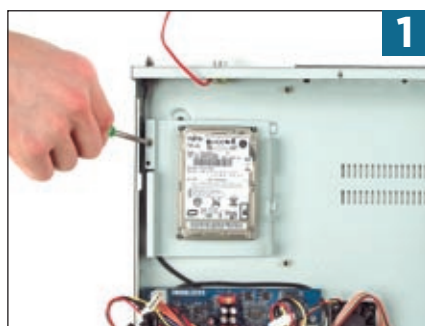
4 Before you fit the optical drive, you'll need to plug in the DDR memory module. Line up the notch in the module with the ridge in the slot and put the module in the slot. Press firmly on both edges until the levers lock the memory into place.

5 Slide your notebook optical drive into the drive tray; it will fit only one way round. Line up the four screw holes on the sides of the tray with the holes in the optical drive, and screw it into place. You'll also need to fit the notebook optical drive to the IDE adaptor. Plug the adaptor's small black plug into the

SHOPPING LIST

(all prices include VAT)

VIA EPIA MII 12000 G 1.2GHz motherboard	£140
Travla C158 Mini-ITX case (60W)	£76
512MB PC3200 DDR400 DIMM	£46
Panasonic UJ85J Dual-Layer DVD+/-RW optical drive	£81
40GB Seagate 2½in IDE 5,400rpm hard disk	£46
Slimline CD to Desktop IDE Adaptor & Audio Cable	£11
2½in-to-3½in IDE cable	£9
TOTAL	£409



small black socket on the rear of the drive and secure it with two screws. Before you mount the tray in the case, you must connect the optical drive to the motherboard with an IDE cable.

Unlike the hard disk's adaptor, the optical drive adaptor doesn't have a socket with a notch, so you could plug the cable in the wrong way round. To avoid this, look on the back of the adaptor. Next to the pins will be four numbers, denoting pins 1, 2, 39 and 40. The ribbon cable has a red wire. You should plug the cable in so the red wire is next to pin number 1 on the optical drive. Plug the other end into the motherboard; this fits only one way round.

There are two four-pin floppy disk connectors attached to the power supply's large 20-pin power cable. Plug one of these into the power connector on the back of the optical drive; the connector fits in only one way. As space is at a premium in the Mini-ITX case, you'll probably have to fold the ribbon cable under the drive. Also, make sure the ribbon cable doesn't obstruct any cooling fans in the case. Put the optical drive tray back in the case and secure it with the three screws you removed earlier.

6 Take the large 20-pin power connector, line up its clip with the notch on the motherboard's 20-pin connector and push it into place. You'll also need to plug in the front-panel connectors. These control the LEDs on the front of the case, as well as the power switch. The connectors plug into pin headers on the motherboard. While the headers are labelled, you have to get the power and hard disk LED

connectors the right way round for them to work. Consult your motherboard's manual to ensure the connectors are plugged in properly.

7 There are also two USB2 ports and headphone and microphone ports on the side of the case. These connect to pin header blocks on the motherboard. The USB cable's connector has one blanked-off hole, which corresponds to a missing pin on the header labelled USB3/4. Match the missing pin to the blanked-off hole and plug in the connector.

Before you plug in the audio cable, you need to remove the two jumpers from the AUDIO header block. These are needed only when you're not using the audio connectors on the side panel. Once again, match the blanked-off hole in the audio cable's connector to the header block's missing pin and plug in the connector. Finally, take the three-pin connector from the case fan and plug it into the three-pin SYSFAN header on the motherboard. Put the case back on and install Windows in the usual way.

8 The Mini-ITX PC draws very little power as standard, but you can make it draw even less by adjusting your PC's power settings. In Windows, right-click on the desktop and select Properties. Click the Screen Saver tab, then click the Power... button. In the Power Schemes tab, use the drop-down menus to set how long the PC should wait at idle before turning off its monitor, hard disks or going into standby mode.

An average 17in LCD uses around 30W of power, and a 17in CRT around 60W, so having

them turn off automatically will save a good deal of electricity. When your hard disk goes into standby mode it also saves 4-5W of power. If you want the PC to use as little power as possible, though, you should set it to go into standby after a few minutes. When a PC is in standby mode, it uses little power, and your programs and documents will still be open when you press the power button to resume from standby.

9 There are two main types of standby: S1 and S3. S1 turns off everything apart from the processor and memory; S3 just keeps the memory going. The operating system, application and document states reside in memory, so you can return to a session exactly as you left it.

The PC uses around 16W in S1 standby mode, and just 1W in S3 standby mode. S3 is definitely the better option to save power. To set which mode Windows will use when it goes into standby, you need to go into the BIOS. Reboot your PC, and press Delete when the POST screen appears. Select Power Management Setup, and under ACPI Suspend Type select S3(STR). Press Esc to go back to the main screen, then select Save & Exit Setup and press Y to save the changes. Your PC will reboot, and will now use only 1W of power in standby mode. **CS**

Next month

SILENCE YOUR PC

Tired of your PC making a racket? We show you how to restore tranquility